

REMARKS

In view of the foregoing claim amendments and the remarks that follow, applicants submit that all of the pending claims are in condition for allowance.

Applicants note that the Examiner did not include an initialed copy of the Information Disclosure Statement, filed with the application, with the Office Action (Paper No. 3). Applicants respectfully request that the Examiner provide applicants with an initialed copy of the IDS with the next Official Communication.

Claim 20

In accordance with the Examiner's suggestion, the spelling of "benzaminopurine" in Claim 20 has been amended to correctly recite "benzylaminopurine."

Rejection of Claims 1-34 and 36 Under the Judicially Created Doctrine of Obviousness-Type Double Patenting

The Examiner argues that Claims 1-34 and 36 are unpatentable over Claims 1-36 of U.S. Patent No. 6,362,393, under the judicially created doctrine of obviousness-type double patenting. The Examiner argues that the claims are not patentably distinct from each other because the genus "wheat" anticipates the species "plant."

Claims 1-34 and 36 of the present application, as amended, are directed to methods for producing rice plants from rice microspores. Consequently, applicants submit that the revised claims are patentably distinct from Claims 1-36 of U.S. Patent No. 6,362,393 which are directed to methods for producing wheat plants. Applicants respectfully request withdrawal of the rejection of Claims 1-34 and 36 under the judicially created doctrine of obviousness-type double patenting.

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Rejection of Claims 1, 7, and 36, and Dependent Claims 2-35 Under 35 U.S.C. § 112, Second Paragraph, for Alleged Indefiniteness

Claims 1 and 36 have been amended to clarify that stressed and contacted microspores are isolated in step (d) of Claims 1 and 36.

Claims 1 and 36 have been amended to recite the additional step of producing rice plants from the cocultured microspores.

Claim 7 has been amended to recite that the aqueous medium comprises a dilution of NPB98 that is less than or equal to 80% of its undiluted concentration. Support for this amendment is found in the specification at least at page 4, lines 33-35.

In view of the foregoing claim amendments, applicants request that the Examiner withdraw the rejection of Claims 1, 7, and 36, and dependent Claims 2-35, under 35 U.S.C. § 112, second paragraph.

Rejection of Claims 1 and 36, and Dependent Claims 2-35, Under 35 U.S.C. § 112, First Paragraph, for Alleged Lack of Enablement

Applicants submit that the methods disclosed in the present application are applicable to any plant species. In order to advance prosecution, however, applicants have amended the pending claims to encompass only methods of producing rice plants from rice microspores. Appended hereto as Attachment A is a Declaration of inventor Calvin F. Konzak (hereinafter the Konzak Declaration), submitted under 37 C.F.R. § 1.132, establishing that inventor Calvin F. Konzak has successfully produced rice plants from rice microspores using the methods disclosed in the present application. As set forth in paragraph 6 of the Konzak Declaration, inventor Calvin F. Konzak, and his colleagues, practiced each of the method steps set forth in independent Claim 1 of the present application to successfully produce rice plants from rice microspores.

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Consequently, applicants respectfully submit that the Examiner's rejection based on alleged lack of enablement should be withdrawn.

Rejection of Claim 35 Under 35 U.S.C. § 102(b), or, in the Alternative, Under 35 U.S.C. § 103(a) as Being Obvious Over Kaneko et al.

Claim 35 has been canceled from the application. Applicants respectfully submit that the Examiner's rejection is now moot.

Rejection of Claims 1-36 Under 35 U.S.C. § 103(a) as Being Allegedly Unpatentable Over Kasha et al. (*Gene Manipulation in Plant Improvement II*, Crop Science Department, University of Guelph, Ontario, Canada, pp. 213-230, 1990)

The Examiner characterizes the Kasha et al. publication as teaching "a method of producing plants from microspores" (Paper No. 3, page 7). Applicants note, however, that the Kasha et al. publication does not disclose any complete method of producing plants from microspores. Instead, the Kasha et al. publication provides a summary and survey of numerous methods that have been used to try to produce plants from microspores. Moreover, the Kasha et al. publication highlights the numerous problems that remained, at the time of publication of the Kasha et al. article, in producing plants from microspores. In particular, at page 225, last paragraph, Kasha et al. state that:

"In summary, while plants have been obtained from isolated microspores of cereals, they almost invariably have developed following cold pretreatments in the anthers, preculturing of anthers before isolation, or from using medium conditioned by anthers or ovules. It is apparent that isolated microspores lack the benefits of the anther substances and further research on the anther factors is critical to obtaining isolated microspore cultures. In our studies with barley and

wheat, we have been able to induce divisions in microspores from freshly harvested anthers but have not regenerated plants."

Thus, Kasha et al. do not disclose a method of obtaining rice plants from microspores, nor do they teach one of ordinary skill in the art how to create a method that produces rice plants from microspores. Consequently, applicants submit that the methods defined by Claims 1-36 are not obvious in view of the teachings of Kasha et al.

Rejection of Claims 1-36 Under 35 U.S.C. § 103(a) as Being Unpatentable Over Genovesi et al. (U.S. Patent No. 5,322,789) In View of Kohler et al. (J. Plant Physiol. 121: 181-191, 1985)

The Examiner argues that it would have been obvious, to a person of ordinary skill in the art at the time that the invention was made, to utilize the method of producing plants from microspores as taught by Genovesi et al., and to modify that method by co-culturing isolated microspores with ovary-conditioned medium, given the alleged advantages of increased regeneration and the guarantee of cell divisions of the isolated microspores as described by Kohler et al. in the summary on page 181.

Applicants note that the pending claims, as amended, are directed to methods for producing rice plants from rice microspores. In contrast, the Genovesi et al. patent is directed to methods for producing corn plants from corn microspores, while the Kohler et al. publication describes the regeneration of barley plants from barley microspores. Applicants submit that the teachings of Genovesi et al. and Kohler et al. are not predictive of the combination of factors that are important for regenerating rice plants from rice microspores, because different cereal species typically have different requirements for stimulating the regeneration of whole plants from microspores.

In this regard, applicants draw the Examiner's attention to the Kasha et al. publication cited by the Examiner (*Gene Manipulation in Plant Improvement II*, Crop Science Department,

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University of Guelph, Ontario, Canada, pp. 213-230 (1990)). The Kasha et al. publication discusses the role of, and problems associated with, anther and microspore culture in cereal improvement. The year of publication of Kasha et al. is 1990, which is the same year that the Genovesi application was filed, and five years after publication of Kohler et al. in 1985. With respect to anther culture (which differs from microspore culture in that the microspores are isolated from the anthers during microspore culture, but are not isolated from the anthers during anther culture), Kasha et al. state that:

"When examining the development of anther culture systems in the different cereals, there is a striking similarity of factors that have been shown to be important to response. However, equally striking is the variability of response among the genotypes within a species and between different species under similar conditions." *Kasha et al. at page 213, second full paragraph.*

By way of further example, at page 220, Kasha et al. note that, "[h]owever, the most recent [anther culture] procedures developed for barley (FHG and BAC₃ media) do not appear to work with wheat." Kasha et al. note, again at page 220, that, "in contrast to barley and most species, cold pretreatment of spikes have not proven to be effective for wheat." Again, at page 220, Kasha et al. note that, "differences in media requirements appear to exist between wheat and barley."

Applicants' assertion that different cereal species typically have different requirements for stimulating the regeneration of whole plants from microspores is further supported by the statement in the Summary of the Kohler et al. publication that, "for callus formation and plant regeneration from isolated microspores of the barley varieties Dissa (Spring barley) and Igri (Winter barley) conditioning of the culture medium was found to be a prerequisite." In contrast,

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Genovesi et al. disclose methods for producing corn plants from isolated corn microspores that do not require, as a prerequisite, conditioning of the culture medium.

Thus, applicants submit that the teachings of the Genovesi et al. and Kohler et al. publications, individually or in combination, are not predictive of the conditions required to regenerate rice plants from rice microspores. Consequently, applicants submit that the methods of the present invention for regenerating rice plants from rice microspores are not obvious over Genovesi et al. in view of Kohler et al.

Conclusions

In view of the foregoing claim amendments and arguments, applicants respectfully submit that all of the pending claims are in condition for allowance. Reconsideration and favorable action are requested.

Respectfully submitted,

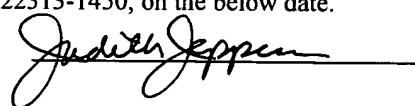
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